



Alternator

An alternator is a generator producing alternate current (AC).

It gets mechanical energy, as input, in the form of rotation of shaft from the internal combustion engine in an automobile. This energy is converted into electrical energy.

The regulator, an essential part, controls the voltage and does not allow it to go beyond permissible limit.

When a bar magnet is moved through a conductor the flow of electrons occurs in the conductor. It is shown in Figure 1.

This shows a rotating bar magnet. The magnetic field, thus produced, passes through the two sides of stationary wire loop.

When South Pole moves past the upper side of loop current is induced in one direction. At the same time, as the North Pole moves past the lower side of the loop, current is induced in the opposite direction.

The current is induced but in opposite directions when similar thing happens and North Pole moves past the upper side of loop and South Pole moves past the lower side of loop. Thus, alternate current (AC) flows in the loop. The current can be increased by enhancing the strength of magnetic field, speed of rotation of magnetic field and by increasing the number of loops.

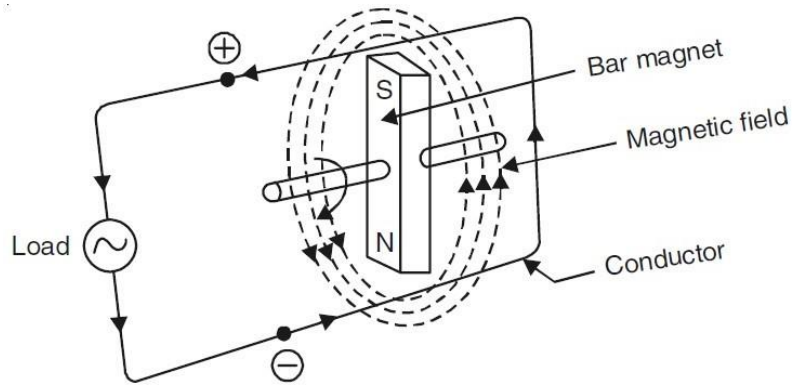


Figure 1 Electromagnetic Induction

Alternator has got one stator that has stationary conductor loop assembled into a laminated iron frame and rotor or armature that is a magnet. Brushes are provided through which the current flows. Brushes are on the upper side of slip rings. Each slip ring is connected to one end of winding. Figure 2 represents an alternator.

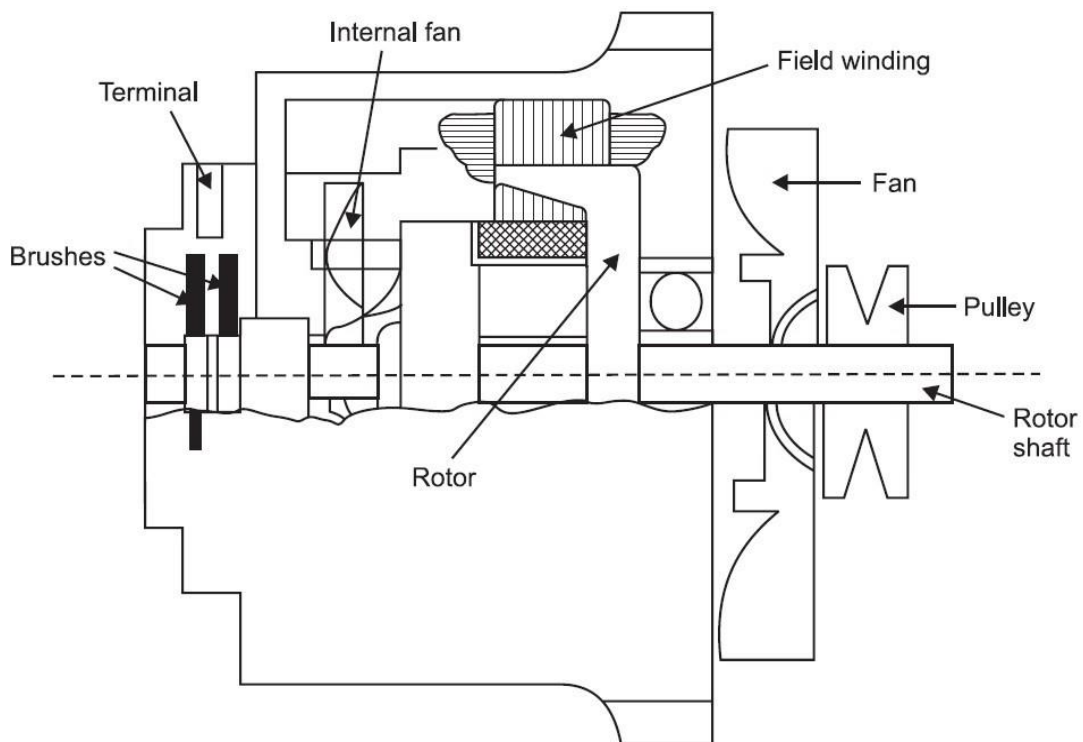


Figure 2 Alternator

The alternate current (AC) is produced by alternator whereas most of the equipment in an automobile require direct current (DC). This is done by providing the rectifiers that convert the alternate current (AC) in direct current (DC). Figure 3 shows the rectifier. This is a six-diode rectifier. The diode allows current flow only in one direction. The loops in the stator are divided into three groups and these form a delta-connected stator or Y-connector stator. The six diodes are connected to three legs as shown.

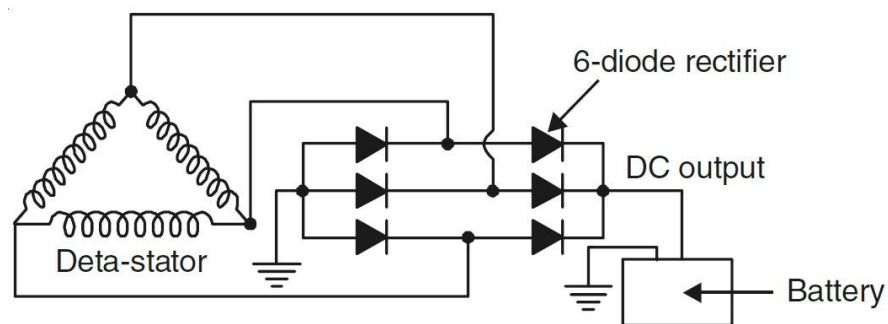


Figure 3 Rectifier Circuit

An alternator while producing electricity, generates some heat also as whole of the input cannot be converted into useful electric current and a part of it is wasted in terms of heat. This loss is mainly due to friction between different moving components. The heat so generated would accumulate in the alternator and would ultimately damage its components. Therefore, it is essential to dissipate this heat. For this purpose, a fan is provided behind the pulley (Fig. 2). There are vents provided so that cool atmospheric air can enter. This helps to keep cool the alternator